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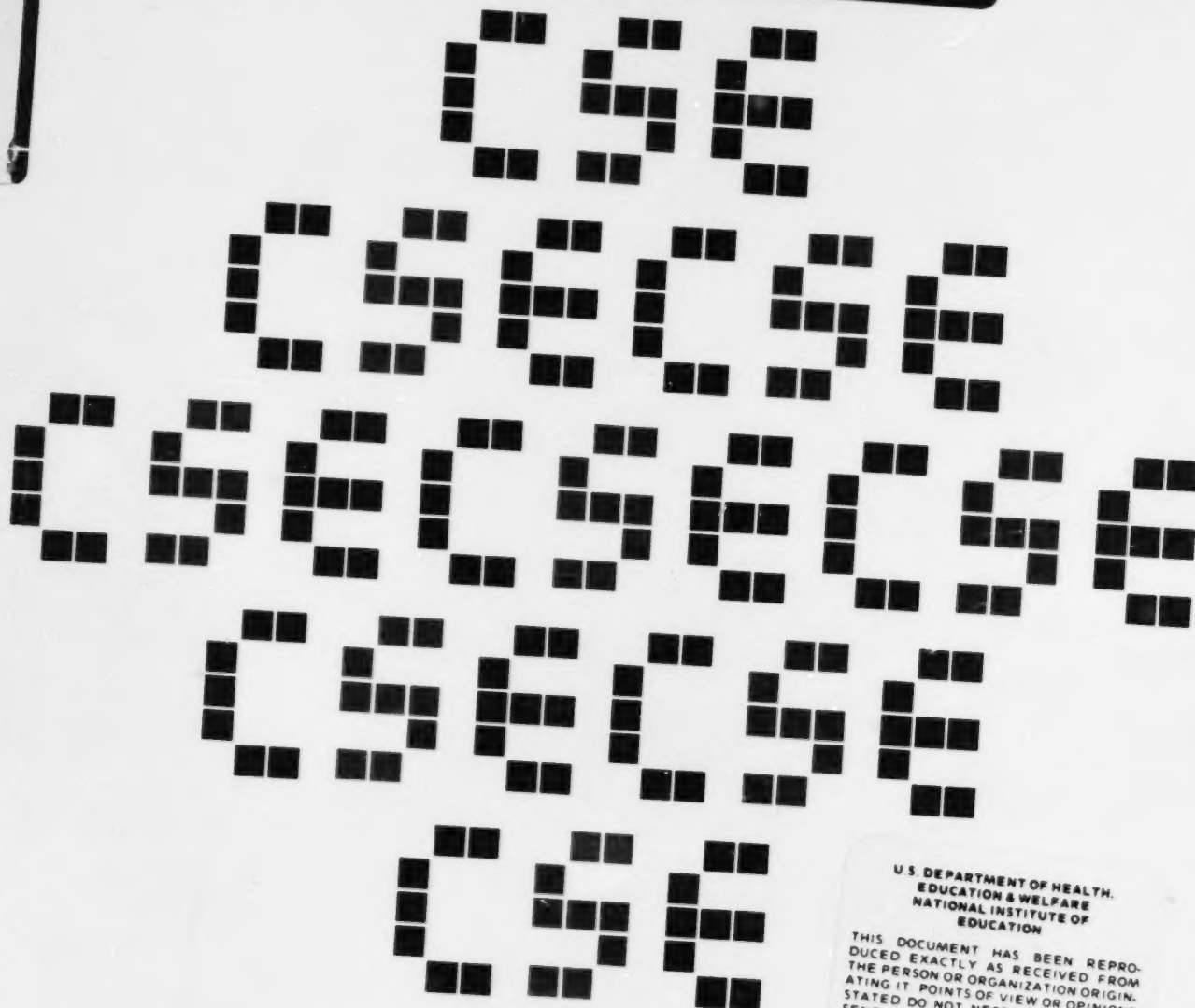
ABSTRACT

This is an overview of a project in which cross-age tutoring is used as a means of enhancing the learning and motivation of the tutors, in contrast to the practice in which the learning of the tutee is the primary focus. This teaching method is referred to as the "Learning-Tutoring Cycle." It is recommended that secondary students who are in need of remedial work in basic skills reinforce their knowledge of these skills by tutoring young students in the elementary grades. In four chapters this overview of the project discusses: (1) the Learning-Tutoring Cycle as a method of instruction; (2) recommended implementation strategies at the local level; (3) recommended federal actions; and (4) the likelihood of success. Appendices include an empirical policy study, a brief bibliography, and a discussion on the rationale of this program as it applies to disadvantaged students. (JD)

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CSE Report on Tutoring
The Learning-Tutoring Cycle: An Overview

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November 1977

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PREFACE

The National Institute of Education (NIE) is the agency of the Federal government that is specifically funded to conduct research in education. When the Education Amendments of 1974 were enacted, NIE was directed to prepare studies of compensatory education in order to assist Congress in making decisions regarding the future of efforts to improve the education of disadvantaged youth. The studies were mandated with a view to the reauthorization deliberations for Title I of the Elementary and Secondary Education Act (ESEA), scheduled to take place in 1977.

In connection with these studies, contracts were let for surveys of existing compensatory education programs, analyses of existing data on program effectiveness, research into the implications of alternative criteria for fund-allocations, and research on the administration of compensatory education. In addition, NIE requested "a systematic and interdisciplinary effort to explore alternatives to current practices in education." Four contracts were let for "Alternative Designs to Contrast with Current Practice in Compensatory Education." Each contractor was to produce "a plan of action which is deemed superior to current practice and not prohibitive in cost of implementation."

One of the contracts went to the Center for the Study of Evaluation for a proposal concerned with cross-age tutoring as a means of enhancing the learning and motivation of the tutors (in contrast to current practice in which the learning of the tutee is the primary focus).

An interdisciplinary committee of ten persons was established to meet regularly at UCLA. In addition to working with this committee, project staff undertook to develop an examination of current school practice by means of site visits and detailed questionnaires in schools conducting cross-age tutoring projects. Because the persons who ultimately implement innovations are the instructional staff, it was important to obtain their reactions to the proposed projects. Presentations were made at faculty meetings in inner city schools, followed up with questionnaires, and a small conference was held at which it was possible to obtain more detailed feedback.

Following these activities, an interim report was submitted to nine reviewers selected by NIE. Committee members and reviewers subsequently met together for two days of round-table discussions.

The production of a single final report would have been an inappropriate way of presenting the body of information that project staff had at hand following these activities. For example, much information that would be of interest to teachers and parents planning or running tutoring projects would not be of interest to policy makers and vice versa. Furthermore, although the position had been reached that one particular kind of tutoring project--the Learning-Tutoring Cycle (LTC)--should be recommended for widespread implementation in Title I projects, there was much to be said about the planning of tutoring projects in general and about highly innovative projects which, although not as immediately feasible as the Learning-Tutoring Cycle, could have greater impact if implemented.

In view of this need to speak to various audiences about diverse topics such as theories, research, policy, practical planning and innovative ideas, seven separately bound volumes were prepared: The CSE Reports on Tutoring.

Report A. The Learning-Tutoring Cycle: Overview

Report #1 Setting up and Evaluating Tutoring Projects

Report #2 Tutoring and ESEA Title I

Report #3 A Survey of Tutoring Projects

Report #4 Tutoring: Some New Ideas

Report #5 An Analysis of the Literature on Cross-Age Tutoring

Report #6 Tutoring and Social Psychology: A Theoretical Analysis

These seven reports provide an information base and a rationale for actions at both federal and local levels.

At the local level, the six numbered reports represent a resource for project planning. Three reports--the Survey (#3), the Literature report (#5), and the Social Psychology report (#6)--bring together information from a wide range of sources to provide background knowledge concerning current practice, the perceptions and recommendations of practitioners, past projects, research, and relevant theories.

This background knowledge can inform the design of tutoring projects as well as provide a basis for judging the likelihood of success of such projects. For example, the Social Psychology report demonstrates that many of the effects of tutoring widely noted by practitioners, but not yet established by research on tutoring, have their parallel in recognized effects in the field of Social Psychology. Social-Psychological theories thus suggest variables that can be assessed in research on tutoring and lend support to the perceptions of practitioners.

The three other numbered reports apply the background information to practical school planning concerns. Report #1, through a presentation of step-by-step planning questions, deals with the process of setting up and evaluating tutoring projects in general. Report #2 introduces the ESEA Title I legislation and considers the planning steps, as per Report #1, in relation to the design of an LTC project in conformity with Title I regulations. Report #4 deals with extensions of the idea of learning by tutoring to more ambitious projects, representing more substantial changes in schooling than are involved in the LTC project. Report #4 also documents the reactions of instructional staff and some Title I parents to the Learning-Tutoring Cycle and other proposed kinds of projects.

For the national level, Report A provides an overview of the project and recommendations for action. The actions recommended are designed to put the ideas of this study to the test, to see if the Learning-Tutoring Cycle can indeed significantly improve the educational attainment of disadvantaged students.

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This study has benefitted immeasurably from the thoughtful contributions of many individuals. Members of the committee represented diverse backgrounds and professional experiences, and their deliberations were invariably stimulating and challenging.

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We were fortunate in having two ex-officio members of the committee who attended meetings because of their long-standing interest in Tutoring: Elbert Ebersole, formerly Principal, Soto Street Elementary School and now a developer of materials for cross-age tutoring in reading; and Arthur Elliott, a professor on sabbatical leave from Simon Fraser University, Canada. Their contributions were of great value to the project staff and to the committee.

The round table discussions with members of the NIE review team and the receipt of their carefully considered written comments on the interim report led to significant shifts of emphasis in the project, and the author is most grateful for their substantial and thoughtful comments.

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CHAPTER I

THE LEARNING-TUTORING CYCLE AS A METHOD OF INSTRUCTION: OVERVIEW OF AN ALTERNATIVE DESIGN FOR COMPENSATORY EDUCATION

The gifted Joachim Fortius used to say that ...if a student wished to make progress, he should arrange to give lessons daily in the subjects which he was studying, even if he had to hire his pupils.

Comenius in Didactic Magna 1849

It may be an exaggeration to suggest that the person who learns most from teaching is the teacher, but certainly almost anyone who has taught reports having gained from the process. Having to teach a subject is seen as leading to a more precise knowledge of details, greater depth of understanding, better insights, and vastly improved retention. Bruner (1963), for example, reported that the third time he explained quantum mechanics to a class having trouble with the topic, he finally understood it himself. The essence of the design proposed in this document is that it capitalizes on this widely recognized phenomenon of learning by teaching.

Not only has this phenomenon of learning by teaching been commented upon by respected educators (Bruner, 1972; Rogers, 1971; Bronfenbrenner, 1970; Thelen, 1969), it is also popularly recognized on a very wide basis, particularly among teachers. Furthermore, as will be shown, there is both theoretical and empirical support for the existence of such a phenomenon.

Tutoring projects in which an older student teaches a younger student on a one-to-one basis have become increasingly popular in schools in the last decade. However, in most projects the focus has been on the provision of instruction for the tutees. The main concern regarding tutors was often that

they should be able to provide instruction with as little prior preparation as possible. Use of eager volunteers or able students enhanced the possibility of an easily run "Tutorial Service" project. Some projects, having become aware of the beneficial effects on tutors, did, however, employ low achieving students as tutors in order that they might benefit. The benefits to tutors were usually thought of in general terms such as the growth of self-esteem or improved attitudes to school. If cognitive achievement of tutors was a concern, it was thought either that non-cognitive benefits--such as improved self-esteem--would lead to general, all around improvements and thus indirectly to cognitive learning, or that students would "learn how to learn" from the experience of tutoring.

An influential book (Gartner, Kohler & Riessman, 1971) perhaps overstated the case by claiming that, by teaching, students "learn how to learn." This claim can lead to the expectation that cognitive benefits can be expected to ensue simply from the experience of tutoring in any subject. This supposition, along with a continuing predominant concern for the learning of the tutees may have led to the neglect of a key feature of the proposed projects: that tutors should teach work which they themselves need to learn or practice. As long as gains for tutors were expected to derive from motivational effects or from a process of learning how to learn, then the actual content they were tutoring was not important: they could teach whatever content tutees needed to know.

We do not for a moment question the importance of the impact on a student's attitudes and motivation from being asked to assume the role of a tutor to a younger pupil. These effects are probably of great importance to the quality of life in schools for both teachers and students; but attitudes and motivation are very difficult to measure and to plan for. Success will be easier to demonstrate if we confine most of our arguments to cognitive effects (cf. Jencks, 1972, p. 12).

Attention to the needs of tutors does not mean that tutees' needs are neglected. Once the topics that tutors will teach have been selected, then tutees are chosen who can benefit from being taught those topics on a one-to-one basis.

Figure 1 illustrates the planning procedure for three kinds of tutoring projects. In "Teacher Aide" projects, one or two older students assist in a classroom of younger students in a variety of ways, at the teacher's discretion. "Tutorial Service" projects provide tutoring on topics selected on the basis of tutees' needs, whereas in "Learning-by-Tutoring" projects, the topics to be taught are selected on the basis of tutors' needs.

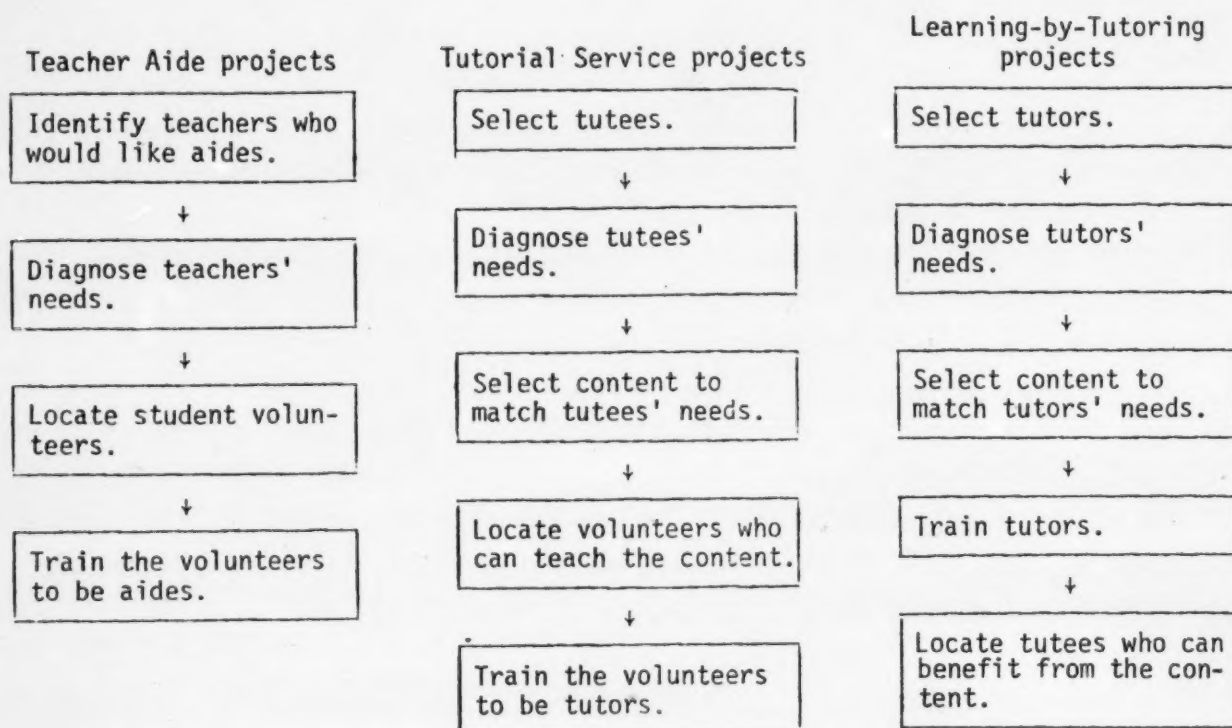


Figure 1. Procedures for three kinds of tutoring projects

Nor do we dismiss the possibility that acting as a tutor might improve a student's learning strategies in the long run. In fact this possibility is discussed in Report #6 and later in this report (p. 25), but empirical evidence for this claim is still lacking whereas a more modest claim is quite well substantiated by evidence from a wide variety of experiments and field studies: tutors do learn what they teach.

This more modest claim is quite a sufficient basis on which to build a successful project. On this basis, if tutors are to receive maximum cognitive benefits, it is vital that the content to be taught be selected on the basis of the tutors' needs. [This emphasis on direct immediate learning is in line with an increasingly accepted finding from compensatory education projects in general: that direct instruction is more effective in producing measurable gains than indirect approaches (Berliner and Rosenshine, 1975). Indirect approaches seek to produce learning gains through broad experiences or motivational techniques, but the consistent correlates of measured achievement gains are practices that involve deliberate, direct instruction (e.g., Stallings and Kaskowitz, 1974).]

Learning-by-Tutoring projects could exist in a great variety, from adult and college situations down to kindergarten, in subjects ranging from art appreciation to basic arithmetic. This report is concerned with a specific kind of Learning-by-Tutoring project--"The Learning-Tutoring Cycle"--applied to compensatory education, with special emphasis on secondary school students as tutors.

It is recommended that secondary school students who are in need of remedial work in basic skills be taught by a method of instruction called the Learning-Tutoring Cycle. In this method of instruction, students learn--from their teachers--a set of clearly defined, small units of the curriculum. These are units that prior testing (as part of a "needs assessment") has indicated the students need to study. This short period of learning is followed by a period of tutoring in which the students--supervised by their teachers--tutor selected students in the specified curriculum units. The cycle resumes with another period of learning for the tutors and a return to the regular classroom

for tutees. The entire cycle occupies a short period of time, such as a week for the learning part followed by two weeks for the tutoring. For tutors, then, the LTC is a method of instruction. For tutees, the LTC project provides supplementary, individual tutoring.

[It must not be thought that the entire learning and mastery of the curriculum units must be accomplished by the tutors during the initial week of the cycle. Tutors will have reached various degrees of mastery during the learning part of the cycle and will continue to learn as they move into the tutoring part of the cycle. While tutoring, for example, tutors may set the tutee to work, consult with the supervising teacher regarding some point of difficulty, or may call the supervising teacher to their desks to ask questions. Learning can be accomplished very quickly when a student is asking for the information.]

Since the Learning-Tutoring Cycle is a method of instruction, it is not viewed as a voluntary or add-on activity, any more than working from a textbook or listening to a teacher's explanation is a voluntary activity. (Clearly to the extent that no pupil can be forced to participate in school at all, every activity is voluntary. The point being made here is that tutoring is no more voluntary than other activities.) In the LTC, then, tutoring is an integral part of the assigned work, an activity in which everyone in the class participates.

We shall, however, use the term "project" in discussing the LTC proposal even though a "project" is often seen as something additional to regular school. The term project is used for two reasons. First, Title I regulations clearly imply that Title I compensatory education funds are to be used for "projects" (see Report #2). Second, we do not recommend implementation of the LTC or any other Learning-by-Tutoring project simply on the basis of the promise such projects hold. Thorough-going formative and summative evaluation of such projects should be planned for from the start. Title I projects, in any case, are legally required to plan for evaluation. Hence, the term "project" conveys this spirit of empirical testing and development which it is hoped will inform the application of the concepts discussed in these reports.

A brief clarification of two terms is in order here: "tutoring" and "basic skills." Tutoring must be distinguished from "teaching." Although tutoring can simply imply teaching on a one-to-one basis, we shall restrict its meaning even further in this document. By "tutoring" will be implied the provision, on a one-to-one basis, of initial instruction in limited, clearly specified objectives, and the supervision of practice on those objectives. Teaching, on the other hand--the job which "teachers" do--involves diagnosis, prescription and evaluation as well as the giving of initial instruction and the supervision of practice. Teachers must also plan the entire course of study or curriculum and organize the classroom and school. Cross-age tutors in no way replace teachers! Students who are cross-age tutors need their teacher as much as do other students and we recommend, in fact, a more intensive pupil-teacher ratio when this innovative method of instruction is employed.

In terms of school subjects, "basic skills" usually refers to reading, language arts, and arithmetic. It must be noted, however, that tutoring involves direct practice in the even more basic skill of verbal communication. Perhaps in no other form of classroom organization is so much practice provided in framing questions, explaining concepts and, in general, seeking clear, effective verbal communication.

Is it essential that secondary students be the tutors? Certainly the Learning-Tutoring Cycle could be implemented within an elementary school with upper-grade pupils as tutors. The recommendation that projects be planned in which secondary students are tutors is made for two reasons. First, their greater age and maturity implies both that they are more able to assume responsibility and that they are more in need of being assigned responsible roles. Second, there is the fact that many secondary students are still in need of instruction in basic skills. The policy of concentrating Title I funds on early intervention programs has not led to problem-free secondary schools, and its advisability is now being questioned (Rohwer, 1971; Larson and Dittman, 1975). There is doubt that early intervention programs alone will result in students completing secondary schooling with adequate skills. Even if early intervention becomes more successful in the future, we still cannot write off the generation currently in secondary schools.

It is a strength of the proposed LTC projects that they serve secondary and elementary students and, while providing direct instruction in basic skills, also represent a change in the normal paradigm of schooling that is likely to interest and motivate both tutors and tutees.

CHAPTER II

RECOMMENDED IMPLEMENTATION STRATEGIES AT THE LOCAL LEVEL

What actions are envisaged at the local level for the implementation of LTC projects? Report #2 provides detailed guidance on this topic, the main aspects of which will be summarized here.

It should first be noted that Title I regulations require the systematic planning of projects. It is recommended that the planning team, consisting of Title I administrators, instructional staff and parents, be provided with the CSE Reports on Tutoring and with past evaluation reports of Title I projects in the district and from other districts known to have implemented projects of interest. This collection of documents provides local planners with the information on research and evaluation that they are required to take into account in planning future projects.

A major study of innovations (Berman & McLaughlin, 1974) recommended that researchers provide school personnel with a "skeletal framework" around which local development of a project might take place. For the Learning-Tutoring Cycle a set of "defining characteristics" has been specified. These are auditable project components. The planning of a Learning-Tutoring Cycle involves designing a project in which these characteristics are implemented.

Defining Characteristics of a Learning-Tutoring Cycle:

1. Older students receive a regular cycle in which instruction in a particular curriculum unit is followed by a tutoring assignment in that unit.
2. The curriculum units represent work the tutors need to learn.

3. The younger students who receive the one-to-one tutoring from the older students initially know the curriculum unit less well than the tutors.
4. Curriculum units are composed of a limited number of clear objectives known to all tutors.
5. Tutoring is supervised by an adult who can help the tutor.
6. Regular assessment and feedback is provided by teachers to tutors and tutees.

The first two characteristics ensure that tutors receive regular instruction and work on topics that they need to learn. The third characteristic ensures that tutees too receive instruction in an area of need. The last two characteristics represent minimal components of the monitoring and feedback system that is deemed essential to continued tutor and tutee motivation.

A framework in which these characteristics can be implemented is as follows: Tutors constitute an entire class in one subject area, such as mathematics or reading. This class is run as a "distinct" Title I project (what OE has called a Type 2 project in which Title I funds pay for the excess costs of running a specially designed project). The Learning-Tutoring Cycle is the method of instruction used in that class. At the beginning of each cycle the teacher of the tutors (the secondary teacher) meets with teachers of the classes from which tutees are to be drawn to plan how the curriculum units might best be presented to the tutees. Following this planning, the secondary teacher works with the tutors accordingly, and the elementary teachers plan their instruction around the fact that supplementary assistance will be available during the tutoring part of the secondary pupils' Learning-Tutoring Cycle. Thus for tutees, the LTC is a supplementary service, fully coordinated with their regular instruction (a "coordinated" Type 1 project).

Clearly teachers need regular release time for joint planning and monitoring of the project. It is recommended that for each class that a secondary teacher runs as a Learning-Tutoring Cycle project, the teacher receive a daily preparation period, preferably the period immediately preceding or following the tutoring class. During this time, the teacher can schedule tutoring sessions, closely monitor the work of tutors with their tutees by examining workbooks,

confer with the teacher of the tutees, prepare materials and instructional strategies, and serve as a trouble shooter. Since many teachers will never have managed a tutoring project, they will need an opportunity--preferably during the summer or at the beginning of the academic year--to run pilot tutoring projects and to receive workshops and assistance if they find such help necessary. Furthermore, any innovative project can benefit from teachers during the opportunity to meet with other teachers implementing the same kind of project.

To summarize: In view of these needs of teachers, it is recommended that provision be made in project budgets for

- regular daily release time for the secondary teacher to coordinate and manage the project and monitor progress of tutors and tutees,
- regular monthly release time for both the secondary and elementary teachers for joint planning,
- pre-service and in-service opportunities for teachers to develop the skills needed to manage tutoring projects, and
- professional opportunities for teachers to meet with others implementing similar projects.

Although these are high cost items, rough estimates indicated that they can be provided at \$300 per child per annum even in addition to the provision of an aide and a one-third time evaluator (see Report #2).

A vital role is envisaged for the evaluator, primarily as a formative evaluator in the first two or three years of a project. Formative evaluators contribute to the development of the project guided as far as possible by empirical evidence of the effectiveness of various procedures. That is to say, the formative evaluator works with project staff to try out various ways in which the project, or specific components of the project, can most effectively be organized. The formative evaluator also lays the groundwork for a summative evaluation that will provide information on the overall effectiveness of the Learning-Tutoring Cycle, information that is meaningful at the local site. Particularly important will be comparisons of the LTC project with alternative methods of serving students in Title I projects. The evaluators will also have the responsibility

for complying with whatever evaluation requirements are deemed necessary by the SEA or the Office of Education for the national evaluation of the Title I program.

It is recommended that following the development of the projects during the formative evaluation period, plans be required for summative evaluation before funds are allocated for that activity. If the plans are such that meaningful information would not result from the summative evaluation, then the evaluation component of the project should be dropped. This procedure would have two important effects. First it would make the design of interpretable, meaningful evaluations at the site level more likely since evaluation plans would be subject to scrutiny and since evaluation funds (but not project funds) would rest on the adequacy of the plans; and secondly, the procedure would prevent the expenditure of funds on evaluation activities which predictably will yield unusable information.

In summary, the CSE Reports on Tutoring provide a "skeletal framework" and resource materials from which LTC projects can be locally developed. Recommended implementation strategies stress release time for instructional staff and evaluation activities that provide useful information at the site level.

CHAPTER III

RECOMMENDED FEDERAL ACTIONS

Federal agencies have already played a significant role in promoting peer tutoring. The widely implemented Youth-Tutoring-Youth projects, which involved low achieving inner city youth as tutors during the summer months or in after-school programs, were run with federal support. Under National Science Foundation grants, researchers at the University of Indiana developed programmed tutoring materials for beginning reading and mathematics, usually administered by paid trained adults [Ellson, Harris & Barber, 1968; Ronshausen, 1974].

At one of the federally funded research and development laboratories (Southwest Regional Lab), tutoring materials for parents have been developed as supplementary material in several of its curriculum packages. ESEA Title III funds supported the development and dissemination of cross-age teaching methods by the Ontario-Montclair school district in California, a project that won a "pacesetter" award. The Office of Education (USOE) publishes several books to assist tutors, and a number of important papers and surveys have been commissioned by NIE on the subject of tutoring: D. J. Klaus' Patterns of Peer Tutoring provides an excellent overview of a wide variety of tutoring projects and presents sensible suggestions for teachers embarking on such projects; S. Bloom's book, Peer and Cross-Age Tutoring in the Schools, which is written on the basis of extensive use of student tutors in reading instruction and will provide practitioners with a conceptual approach and a source of practical ideas for classroom procedure. Deterline (1970) reviewed four major tutoring projects under a USOE grant to prepare a report entitled Training and Management of Student Tutors.

Although many of these documents recognize the substantial benefits to tutors, particularly non-cognitive ones of motivation and self-esteem, none focusses on the use of tutoring as a method of instruction for the tutor. Almost always,

the choice of the content to be tutored is seen as being determined by the needs of tutees. Selection of tutees because they can appropriately be taught the content which tutors are prepared to teach is not discussed.

The attention to tutoring at the federal level reflects a responsiveness of the offices to school concerns for, as Klaus noted, "Schools and teachers all over the country are enormously interested in peer tutoring...." (Klaus, 1975:1). This commendable interest should now be brought to fruition with provisions for research into tutoring in general, along with some deliberate and relevant empirical policy studies. One empirical policy study, involving evaluation of the effects of various simulated regulations, will be proposed here. As was clearly established in a paper commissioned by NIE to a Stanford University researcher (Calfee, 1974), despite widespread interest, there has as yet been very little solid research into actual school tutoring projects. [This situation is also illustrated in Report #5 and by a review (Devin-Sheehan et al., 1976)].

One possible federal strategy would be simply to make the CSE Reports on Tutoring widely available to Title I planners leaving the implementation of various kinds of tutoring projects entirely up to local initiative. However, there are two principal reasons why this approach appears inadequate. One is that adoption might proceed slowly. The Learning-Tutoring Cycle represents an unfamiliar method of classroom organization. It is not a set of materials neatly packaged, needing only to be unwrapped and handed out. It is a project demanding high levels of initial effort and organizational change. Some stimulus to adoption is desirable.

(On the other hand, it should be emphasized that if teachers were directly given choices as to what kinds of Title I projects to implement and if the kind of budget recommended in this proposal were proposed to support LTC projects, then we would expect to see very rapid adoption of the projects. While the LTC makes great demands for reorganization on teachers, the recommended implementation strategy concentrates on providing the time and support that teachers at each site would need in order to meet the demands of the project. These incentives, coupled with the general acceptability to teachers of the project's

ideas [see Report #4] would probably lead to widespread adoption if teachers were the decision-makers regarding initial adoption of projects.)

A second argument against leaving the CSE Reports on Tutoring to carry the full burden for the dissemination of the Learning-by-Tutoring concept in general, and the Learning-Tutoring Cycle in particular, is that even where tutoring projects are adopted, there will be no guarantee of meaningful evaluation at any one site, let alone across sites, and certainly not at the level of detail at which the method deserves investigation. Report #6, for example, dealing with theoretical conceptualization of the effects of tutoring projects, and Report #5, dealing with the literature on tutoring, instance many important investigations that have never been attempted in evaluations of tutoring projects. Calfee's paper, referred to earlier (Calfee, 1974), suggested yet other investigations that are urgently needed.

Recommended empirical policy study. To avoid slow adoption and inconclusive evaluation, it is recommended that an empirical policy study be conducted by NIE of not only LTC projects but of LTC and many other kinds of tutoring and non-tutoring Title I projects. The question that needs to be answered, if Congress is to find a method of improving the education of disadvantaged students, is "If incentives are provided for defined strategies, can schools significantly improve the achievement of educationally deprived children?" Tying funds to defined strategies, rather than only "laying on money in the name of doing good,"* is a federal level intervention that needs investigation.

In the case of the Learning-Tutoring Cycle, highly effective projects almost certainly can be designed and implemented and, even if adoption is left entirely up to local choice and initiative, we shall undoubtedly see some effective projects sooner or later. But even with naturally-occurring successful projects, it would still not be known whether the method would be successful if implemented not by the few with high initiative, or those to whom the project immediately appeals, but on the much wider basis that will undoubtedly

*A phrase coined by Worth, Bateman and quoted by Timpane (1970).

be required for substantial impact. To obtain information relevant to policy, what needs to be known is whether tying the provision of funds to the implementation of a defined project strategy, such as the LTC, leads to significant improvements in the education of disadvantaged pupils. Put in another way, the following research hypothesis needs testing:

Given incentives to try out the Learning-Tutoring Cycle as a specified paradigm of instruction, teacher will obtain higher student achievement and satisfaction using this specified paradigm than the same teachers obtain either using other specified paradigms of similar costs or using normal schooling procedures.

It should be noted that a variation on this theme was attempted in a sense in the Follow Through projects. In those projects, rather than a parsimoniously specified paradigm, as contained in the defining characteristics for an LTC project, total systems were specified, taking control of many variables at once rather than just a few. The results of such total system interventions should have been dramatic if our current ability to design social systems to achieve goals had been adequate. However, the experience of the Follow Through projects suggests that our current knowledge of school learning and organization may still be inadequate to the task of designing highly effective total systems but that there are also several critical drawbacks to the strategy of taking control of so many variables at once.

Implementation of a detailed total system or set of concepts is usually an uphill battle of communication and persuasion. Even when the system is successfully installed at one site, following enormous external efforts to reach this point, the transferrability of the system to other sites is yet another uphill battle requiring again the imposition of required behaviors on previously autonomous teachers and others. This means that the dissemination of total systems is bound to be an incredibly slow, expensive, and lumbering process, constantly running into the danger of being imposed from the top down and meeting intractable opposition.

Finally the evaluation of a total system is problematic. What aspects of the system account for failures or successes? What, if anything, can be changed without endangering the success of the system? If there are poor results,

where are changes to be made? And total systems can hardly be legislated, so that their success is more of research interest than policy-relevant. In contrast, the tying of incentives to a specified paradigm with auditable characteristics is a quite feasible federal intervention. What is needed is a study of simulated incentives to see if the strategy works and should be implemented on a wide basis.

A major recommendation, then, is for the conduct of an empirical policy study which, while providing direct services, will constitute a policy-relevant experiment:

Social action programs and programs of social experimentation probably must, in the political nature of things, proceed side by side if either is to succeed fully (Timpane, 1970, p. 548, emphasis added).

The fact that the Title I program has been funded only at a level that allows only a small proportion of eligible children to receive services means that there are large numbers of school sites eligible for, but not receiving, Title I funds. Many of these sites would undoubtedly welcome a chance to participate in well controlled studies to determine which promising Title I interventions are the more effective.

An outline of one way in which the proposed policy study might be conducted is presented in Appendix A. Key features are:

1. The implementation of TWO Title I interventions at each site to enable the assignment of equivalent groups of eligible students to each intervention and the evaluation of their comparative effectiveness at each site.
2. The contracting of the empirical policy study not only to the usual Research and Development organizations, but also to school district R&D units. [Most federal research grants go to Labs and Centers or to non-profit research organizations, but NIE has been urged to promote expertise at the LEA level (Education Daily, Nov. 6, 1975). School districts are now beginning to have the trained personnel available to

conduct high quality research. School district research units may have greater influence in schools and, by participating in a study such as the one proposed, would develop valuable experience contributing to continuation of effective projects.]

3. Provision of formative evaluation followed by proposals for summative evaluation that must be approved by NIE before being implemented (to avoid implementation of inconclusive evaluation designs).
4. Interventions to be designed to conform to simulated regulations so that findings have direct immediate and clear implications for subsequent federal policy.

In conclusion, it is recommended that tutoring projects specifically designed to enhance the competence of the tutors in basic skills be widely adopted as an exceedingly promising practice for compensatory education. A series of Reports on Tutoring has been prepared which can be used by persons involved in the local planning of such projects. However, in order to obtain hard evidence and thorough evaluation, and to test regulations that might tie funds to specific kinds of projects, a major recommendation is that an empirical policy study should be conducted by the National Institute of Education through contracts with two kinds of organizations: research and development organizations and school district research and development units. Such an empirical policy study would provide direct services while evaluating the effectiveness of simulated regulations in actual school settings.

...a major focus of R&D policy should be--through experimentation and through incentives that encourage new patterns of institutional behavior--to encourage a long-overdue diversity of approaches to schooling (John Pincus, Director of Education, RAND Corporation, 1974, p. 139).

CHAPTER IV

LIKELIHOOD OF SUCCESS

Is the Learning-Tutoring Cycle likely to be successful? Before considering this question, one must consider a necessary precondition for success: Is it reasonable to expect that LTC projects can be implemented particularly on a large scale such as will be needed to yield significant benefits in compensatory education? A project might be designed which could hardly fail to be successful if implemented, but if its implementation required highly unlikely human behavior, excessive costs, or if implementation would arouse intense objections, then talk of its success becomes academic.

Feasibility: Will LTC projects be implemented? Do LTC projects rest on unrealistic views of how teachers or students behave? Do LTC projects arouse objections or cost too much?

It must be noted that the many tutoring projects which have already existed in schools across the country are evidence that the LTC is feasible, even though these projects have been primarily of the Tutorial Service kind, focussing on the needs of tutees rather than planning for the needs of tutors. Many of the procedures--for example, the pairing of tutors and tutees, training of tutors, supervision of the tutoring sessions, and management of the interpersonal and administrative problems that arise--are essentially the same in a Tutorial Service project as they would be in an LTC project.

Furthermore, most of the tutoring projects that were located in the survey (Report #3) had arisen quite independently of other projects. Most teachers running projects had not had the benefit of any in-service training, special materials, or demonstration projects. Most projects had been spontaneously

designed by teachers or school administrators. This is not to say that projects could not benefit from the provision of training and materials, but just to stress that no massive dissemination effort is likely to be needed just to get tutoring projects off the ground. Most teachers could start running such a project tomorrow if the schedule was so arranged. At the very least it is reasonable to expect that if a few high initiative teachers and administrators can spontaneously create projects in their normal working day, then most teachers could manage such projects when provided with planning time, pre-training, experience, release time, administrative support, and the assistance of a formative evaluator.

However, the committee working on this project did not simply argue from the survey and from their own experience. To further assure ourselves that the LTC was as feasible as it would seem, the ideas of the LTC were presented in faculty meetings in inner city schools. As described in Report #4, both secondary and elementary school teachers saw the projects as promising and feasible. Secondary teachers felt they could adapt the content of their teaching to make it suitable for their students to teach to elementary children, and elementary teachers did not balk at the idea of supervising secondary tutors, even when it was made clear that the secondary tutors would be low achieving students.

A conference on inner city teachers (also reported in Report #4) allowed a more thorough probing of exactly what procedures would or would not be acceptable. The only way in which it was found necessary to modify our proposals was in the idea that tutors might introduce new topics for tutees rather than supplement the tutees' regular instruction. Many elementary teachers were unwilling to allow tutoring of their pupils to be more than an adjunct to regular instruction. For tutors, however, secondary teachers felt that the Learning-Tutoring Cycle could be the method used in regular instruction, not simply an elective or add-on project.

Clearly the likelihood that projects will be implemented is intimately related to the kind of implementation strategies to be tried, especially regarding incentives to be made available for teachers. The recommended implementation strategies, briefly described in Chapter II of this overview, and more fully in Report #2, provide teachers with release time. This release time is not only in itself an incentive, but it also provides teachers with time for the planning and conferences needed for a successful project.

At an initial cost of about \$300 per pupil per annum (a usual figure for Title I expenditures) a secondary teacher can receive a period of release time for each period of LTC teaching; the elementary teacher receives a teacher's aide. Both teachers receive conference expenses, a day a month for joint planning, and the assistance of a one-third time formative evaluator. The figure also includes preparation of both teachers in the preceding summer. Costs per pupil drop to \$130 once the project is established so that pre-training and the formative evaluator are omitted. At this low level of expenditure, teachers still receive the benefits of release time, conferences, and the assistance of an aide.

Considering that most tutoring projects have been run on a shoestring (see Report #3), this kind of input should ensure not only the implementation of projects, but also high quality in the projects. In particular, the role of the formative evaluator, devoting one third time to each group of four teachers running LTC projects (two secondary and two elementary teachers) is to ensure quality and a maximum level of success by assisting teachers in their constant assessment and revision of the procedures.

And what of possible objections to projects from teachers or parents? The experience of existing projects is again relevant to some extent. As shown in the survey, projects have encountered practically no objections from parents (e.g., p. 28 and 29 in Report #3). However, most existing projects involve tutors on an elective, voluntary basis, and in Learning-Tutoring Cycle projects it will be necessary to show that tutors are learning from tutoring if parents and teachers are not to raise the objection that tutors should be working for themselves rather than teaching others. The evaluation should be designed to monitor this question, and the entire project should be implemented on the understanding that the LTC method of instruction will be tried and evaluated, not adopted on faith.

Further support for the acceptability of LTC projects comes from recognizing that they can fit easily into existing school structures. For example, as shown by the survey, many projects, even those involving cross-school rather than just within-school tutoring, have managed to fit tutoring into the regular bell schedules.

As far as acceptability of LTC projects to students is concerned, this is one of the strengths of an LTC project: tutoring is usually accepted enthusiastically by the majority of students. Even projects in which tutoring has been an assigned activity rather than an elective have not encountered problems in student participation.

In summary, LTC projects are highly feasible in terms of their acceptability to teachers, parents, and students, in terms of their adaptability to existing school structures and practices and in terms of the costs associated with even high quality implementation designs. Learning-Tutoring Cycle projects could be rapidly and widely implemented.

Likelihood of success. How can one assess the likelihood of success of innovative projects when almost by definition innovative projects have either few or no exemplars? In the case of LTC projects no exemplars can be cited although the survey (Report #3) describes some similar projects, and the literature review (Report #5) instances some small scale, short duration projects that were similar to the proposed LTC projects and led to significant gains for tutors and tutees (Mohan, 1972; Hoffmeister, 1973; Fitz-Gibbon, 1975).

Lacking existing Title I LTC projects from which to draw directly, we must rely on three sources of evidence:

- (1) Theoretical analysis. Are there theoretical or logical reasons to expect success?
- (2) Empirical evidence from similar procedures. Do small scale experiments or studies of projects reasonably similar to LTC projects indicate that successful outcomes occur as expected?
- (3) Expert testimony. Do persons with experience in education in general or with tutoring in particular see LTC projects as likely to be effective? Do practitioners involved in similar projects report success?

Ultimately empirical evidence is probably the most persuasive. Testimony of practitioners is problematic because their involvement almost necessitates

their believing in the methods. The testimony of experts suffers from the problem of deciding who is an expert in any particular area, and theoretical analysis is never conclusive in the social sciences since arguments from "basic" research to school practice are almost inevitably arguments by analogy, to be readily discarded in the event that practice does not confirm the predictions of the theory. However, to the extent that all three sources of evidence converge, we have stronger arguments. No arguments can be conclusive, but the aggregate may indicate the projects deserve being put to the test..

Theoretical analysis: Are there logical or theoretical reasons to expect success? It was emphasized at the beginning of this overview that the concept underlying these proposals is that of learning by teaching. Are there theoretical reasons to suppose that teaching will promote learning, i.e., that the learning by teaching phenomenon exists?

One possibility is that it is not teaching itself which promotes learning, but the knowledge that one is going to teach. If students know they will have to teach, this may induce greater effort in initial learning. This greater-initial-effort effect may exist, at least for some students, but two attempts to demonstrate it have failed (Allen and Feldman, 1973; Fitz-Gibbon, 1975) (Details in Report #5).

There are a number of processes that occur during the tutoring session, as the tutor explains the work to a tutee, that may induce learning in the tutors. Before describing these processes, it should be noted that the effects of tutoring may derive simply from the fact that tutors spend more time "on task" than students in regular classes, thus obviating the need to attribute the superior learning of tutors to qualitative differences. However, studies collecting such observations have not been made, and the qualitative differences to be described may act in addition to differences in time-on-task.

Among possible qualitative differences between the situation of being a tutor and the situation of being a pupil in a regular classroom, is the difference in arousal. Confronting another individual on a personal one-to-one basis

involves some stimulation, as can be deduced from the observation that people seldom fall asleep in such a situation, whereas sleeping in class is a common experience. Thus the role of tutor is more arousing than the role of pupil. It has been suggested by motivation theorists that arousal is in itself a sufficient condition for learning (Valenstein, Cox and Kakolewski, 1970; Routtenberg, 1968; Berlyne, 1967). Paper clips pinching the tails of rats, and thus causing a non-specific arousal, induce learning activities in the rats (Koob, Fray and Iverson, 1976).

Another qualitative distinction between the process of learning in a regular classroom and in a tutoring situation lies in the verbalization demanded in tutoring. Many studies suggest that active verbalization enhances learning. Performance on the Matrices test was improved by instructions to reason out loud (Merz, 1969), and significant improvements in learning were found among educationally retarded children when they were required to verbalize while learning (Jensen, 1963). (It might be mentioned--parenthetically since we are discussing here the learning of the tutor--that for tutees, the tutors' speech might be more readily comprehensible than that of their teachers, and this may assist in the tutees' learning.)

Verbalization may in some way have an effect of its own (do we listen to ourselves speak?), but the very presence of verbalization is also indicative of the active cognitive processing that is induced by the attempt to teach a topic. In other words, having to explain a topic to someone, as a tutor must explain to a tutee, involves active organization and verbalization of the material. Thus tutoring involves what Piaget calls "re-presentation." Wittrock (1974) speaks of "generative learning" and behaviorists of the importance of overt responses and verbal mediators. Whatever the terms involved, they all imply that explaining a topic one has just learned will enhance one's learning and retention of that topic.

Below, a learning psychologist explains how various stages of the tutoring process stimulate and reinforce learning in the tutor. He notes that objectives provide an advance organizer or conceptual framework, tutoring itself requires cognitive contact with the material, and tutoring sessions provide

intrinsic and extrinsic reinforcements. Tutoring demands the rehearsal and organization of material, its storage in memory, and its retrieval from memory. All these processes are associated with enhanced learning and retention:

1. The tutors are required to understand the objectives of the material they are teaching to the tutees. The objectives provide the tutor with a conceptual framework that helps to organize the detailed information in their memory.
2. The tutors must perforce concentrate on the instructional content while tutoring. It is very difficult not to attend to the material while teaching it to another person.
3. Completion of each tutoring session not only provides the tutors with an intrinsic sense of achievement, but the subsequent attention and conversation with the teachers involved constitute an additional reinforcement for having been involved in an important task.
4. In order to teach the material, the tutor has to organize it in his mind and rehearse what he is going to do in the tutoring session. There is a long literature on the enhancing effect on retention of actively organizing and rehearsing in one's mind material that must later be recalled. Such activity provides practice in storing information in memory.
5. The actual tutoring itself constitutes a mandatory occasion to practice the retrieval of information from memory (the other half of retention). Producing the information to the tutee provides the tutor with the necessary skills in fetching the stored information by using whatever cues are at hand. Most often, failure to retain information is less a matter of faulty input to one's memory during initial learning than a problem of inadequate practice in retrieval from memory (Silberman, 1976).

Possible long term effects on the learning process. Although cognitive achievement is a primary aim of Title I compensatory education projects, the needs assessment requirement implies that a search must be made for the causes of low achievement so that projects may be designed specifically to remedy those problems that prevent achievement. Other than a direct attack on the teaching of the basic skills, are there remedial strategies available that will improve achievement? For example, alleviation of health problems, or the broadening of the child's experiences by field trips have been seen as indirect approaches to the problem of low achievement (although clearly such services could be justified on many other grounds).

In general, the evidence from compensatory projects to date appears to imply that direct instruction is the most effective approach to improved achievement scores, and it is the highly planned and structured projects that show the greatest cognitive gains (McDill, McDill and Sprehe, 19 ; Hawkridge and Tallmadge, 1968; Stallings and Kaskowitz, 1974). Nevertheless, the search continues for what might be called the non-cognitive correlates of cognitive achievement.

The idea of discovering ways in which children can "learn how to learn" is still appealing because of its greater potential for lasting effects. In the Coleman report (Coleman et al., 1966), a locus of control variable was one of the few non-cognitive correlates of achievement found. More recently, attention of some research has been focussed on a test called the Intellectual Achievement Responsibility Test (IAR) (Crandall, Katkovsky, & Crandall, 1965; Stallings and Kaskowitz, 1974) which is designed to measure the extent to which a person takes responsibility for their own successes or failures in areas of intellectual achievement--a kind of locus of control for intellectual success and failure. To the extent that students attribute their successes and failures externally--to luck, test difficulty, lack of help, for example, rather than internally to their own efforts--they are expected to be less likely to expend effort on intellectual tasks. A low score on the IAR is supposed to indicate a tendency to attribute intellectual achievement to external causes.

Another measure of interest is the Children's Associative Responding Test (CART) which measures the tendency of children to answer multiple choice items

by simple association rather than by relying on their own reasoning powers to arrive at the answer. Does tutoring affect these measures, measures which can be seen as generally related to the child's "sense of agency" or locus of control? Salomon and Achenbach (1974) reported that both being tutored and being a tutor led to better scores on the CART. However, their experiment involved special materials to train children not to respond associatively, so whether the improvement would have occurred without the special materials, simply as a result of the experience of tutoring, is not known.

The main point to be made about tutoring and the locus of control or sense of agency variables is that the change of role for tutors--thrusting them into positions of responsibility in which they must declare work correct or incorrect, observe the effort, success and failure of tutees, explain why answers are correct, not get get answers correct--may increase their sense of agency and begin, slowly perhaps, to lead to a learning how to learn that could eventually result in generalized improvements in many areas of academic or even non-academic endeavors. The possibility is too important not to mention even though the area is still essentially one of speculation.

However, one is not faced, in considering tutoring projects, with a choice between direct instruction or an indirect approach to cognitive skills. The Learning-Tutoring Cycle involves direct instruction, but it is also a method of instruction potentially valuable in making more fundamental changes in tutors' sense of agency.

The theoretical considerations just discussed were drawn from the field of psychology. Theoretical arguments from other fields also predict positive effects from tutoring projects. In the area of satisfaction, the perspective of Washburn (1975), an anthropologist, is relevant. Washburn postulated that the problems in schools "arise from the loss of the traditional folk-learning situation in which learning depends on identification, emotion, and clearly visible goals" (p. 8). "From a biological point of view," he suggests, "perhaps the most fundamental change that could be made in the schools is to give back the role of teachers to the peers." Washburn sees tutoring as a way to put pleasure back into learning.

The point of teaching by peers is to restore the conditions of learning that are natural to man, the kind of situations in which the human brain evolved. Just as many sports continue natural situations of maturing and learning, situations that are pleasurable and socially rewarding even if one has to practice long and hard, so peer teaching could be used to create intellectual situations that would be pleasurable and rewarding even if one had to practice long and hard (p. 7, 8 emphasis added).

Turning from anthropology to social psychology, many established effects in that field can be seen as analogous to effects widely cited in tutoring projects. The implications from the social-psychological literature are discussed at length in Report #6. As an example, we might cite effects that may serve to reduce the discipline problems that Gallup polls have year after year reported as the major perceived problem in schools. When students act as tutors they take on the role of a teacher. Role taking has been shown to be an extremely potent technique for reducing interpersonal conflict (e.g., Bohart, 1972). Role taking has also been shown to increase empathy with another (Stotland et al., 1971). We would thus expect that when students take on tutoring roles, this would serve to reduce conflict between students and their teachers as well as to increase tutors' empathy and understanding of their teachers, a process frequently reported by tutors themselves.

In short, as far as theoretical analysis is concerned, there is no scarcity of explanations for the positive effects on learning and upon attitudes that are expected from tutoring projects. From the fields of learning theory, social psychology, and anthropology, established concepts and processes can be seen as predicting benefits from cross-age tutoring projects, especially for tutors.

Empirical evidence. We turn now to examine empirical evidence, emphasizing that no exemplars exist of the actual kind of project proposed. Details of most of the experiments and studies referred to in the following paragraphs can be found in Report #5.

Do tutors learn by teaching? Many studies (Cloward, 1967; Hassinger and Via, 1969; Rosner, 1970; Lakin, 1971; Liette, 1971; Mohan, 1972; Strodbeck and Grannick,

1972; Hoffmeister, 1973; Allen and Feldman, 1973; Fitz-Gibbon, 1975) have been claimed as successful in producing learning gains among tutors. Unfortunately, gains have often been measured against "expectations" or against no treatment control groups rather than against control groups receiving some alternative program directed toward the same objectives.

In Fitz-Gibbon's study, however, involving inner-city ninth graders tutoring fourth graders in fractions, tutor achievement of eleven objectives was compared with the achievement of an equivalent group of students who remained in class working on the same set of objectives. Tutors' achievement was significantly higher than non-tutors, not only immediately after the three week project, but also three months later on a retention test. Many more investigations in which being a tutor is contrasted with some other feasible alternative will be required before a full understanding is achieved of when and how and to what extent learning by tutoring is superior to learning by being a pupil.

As far as learning by the tutee is concerned, there is not likely to be much doubt expressed that individual tutoring will be beneficial for the recipient of the tutoring--the tutee. However, only one experiment has actually investigated the benefit of being taught individually as opposed to being taught in a class (Bausell, Moody and Walzl, 1972). Equivalent groups of pupils were taught either as tutees or as members of a class, by the same teachers. Tutees achieved more highly than classroom-instructed pupils.

The major area of doubt, however, regarding the LTC's benefits of tutees, would perhaps be in the effectiveness of low achieving pupils as tutors. Fortunately for the present argument, several projects and experiments have involved either low achieving tutors exclusively or tutors drawn from the entire range of achievement (Cloward, 1967; Newmark and Malaragno, 1969; Rosner, 1970; Thomas, 1970; Liette, 1971; Mohan, 1972; Ebersole, 1971; Fitz-Gibbon, 1975). There seems little doubt that with training low achieving students can be effective tutors.

One study, Allen and Feldman (1973), indicated that tutees did not learn from being a tutee as much as they learned studying alone. However, this study,

involving only seven tutors and seven tutees in the analysis, had fifth graders tutor third graders after simply studying the material alone for eight minutes prior to teaching it for 20 minutes. Actual school projects are not expected to be run with so little preparation for tutors, so the results of this small, though widely quoted, study are not considered a threat to the general conclusion that tutees learn when tutored by trained, older pupils.

In short, it is reasonable to conclude from the diverse literature available that, with training, tutoring can work very well: older children can measurably increase the achievement of younger children. What the literature lacks in tightness of design in some studies (Frager and Stern, 1970; Mainiero, 1971; Dreyer, 1973; Salembier, 1976; Hassinger and Via, 1969) is perhaps made up for to some extent in the convergence of results from both the well controlled and the less well controlled studies. Importantly, many studies have involved samples of students from low income, low achieving populations, such as those served by ESEA Title I (e.g., Cloward, 1967; Melaragno and Newmark, 1969; Frager and Stern, 1970; Ebersole, 1972; Fitz-Gibbon, 1975).

Expert testimony. Finally we turn to expert testimony. Who are the experts? If those in schools are the experts, there is widespread agreement that tutoring projects are effective in producing a great variety of benefits, among them cognitive learning. Their opinions can be seen in the questionnaire responses in Report #3. We can also cite the perception of Chicago researcher Herbert Thelen:

...the educators (almost to a man) feel that tutoring works. I can think of no other innovation which has been so consistently perceived as successful (Thelen, 1969, p. 230).

In general, cross-age tutoring has had a very good press:

There is nothing so personally stretching--on both sides of the table--as for one student to help another, and for each to grow in the process (Carl Rogers, 1971, p. 217).

Perhaps the most promising possibility which the total school offers in furthering the development of the child is the active involvement of older and, subsequently, younger children in the process (Urie Bronfenbrenner, 1970, p. 156).

However, none of the sources of evidence cited--theoretical arguments, empirical evidence from similar projects and testimonials--can do more than suggest that the proposed Learning-Tutoring Cycle is worth trying.

The crucial question is whether the LTC, when implemented in Title I schools by local personnel working with the implementation strategy recommended, will produce learning gains and social effects unmatched by other Title I interventions. Only an empirical policy study can answer that question.

AN EMPIRICAL POLICY STUDY

Far too little is known at present about the do's and don't's of getting a large scale field experiment (including random selection and assignment) underway (Porter and Chibucos, 1975, p. 241).

The study described below is a small-scale policy study which could be viewed as a pilot run for a larger scale study. Four treatments are to be randomly assigned in pairs, making, therefore, six distinct pairs of treatments. The four treatments are simulated regulations which require the implementation of either

- LGNT a project of any kind, locally generated by a specified planning team
- LGT a project involving cross-age tutoring, locally generated by a specified planning team
- EDNT a designated Title I project such as one of the PIP projects
- EDT the Learning-Tutoring Cycle project

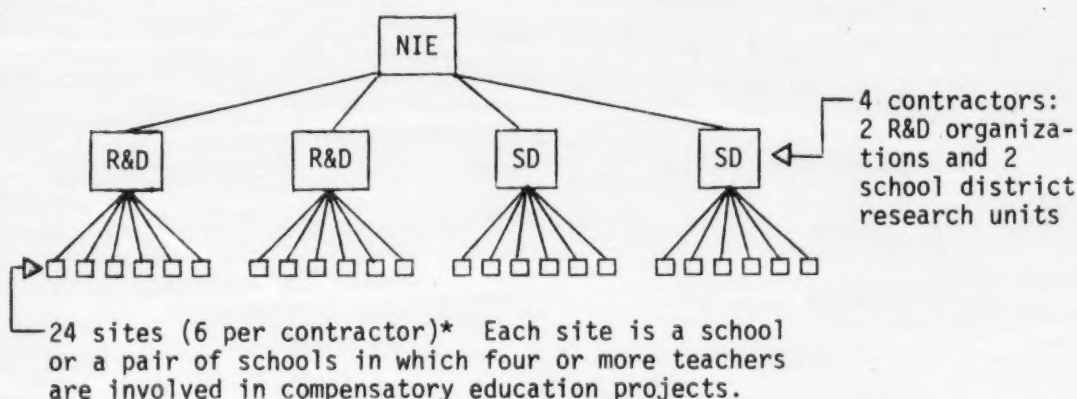
Initials designating these treatments are derived from the cells of the following matrix:

	tutoring	not tutoring
locally generated	LGT	LGNT
externally defined	EDT*	EDNT

*the LTC project

In order to make data aggregation across sites a meaningful procedure, it will be necessary to make the projects comparable in some important factors. Grade levels served and subject area would seem to be the most important ones to control, assuming all projects take place in Title I eligible communities, thus controlling SES as a background factor. It is recommended that for a pilot study, projects be restricted to, say 4th and 9th grade students in projects aiming at basic quantitative skills (mathematics). Mathematics achievement may be easier to measure than reading achievement, and the specification of objectives in mathematics for all grade levels is more easily accomplished than the specification of appropriate objectives in reading.

METHOD: NIE contracts with two research and development organizations and with two school districts that have well-staffed research units. Each of the four contractors is responsible for recruitment and evaluation at six sites.



At each site two of the four treatments are implemented. The first year of implementation is devoted to formative evaluation to improve the program and to lay the political and methodological groundwork for summative evaluation. Throughout the second year there are cycles of summative evaluations employing intact experimental designs at each site. The third year summative evaluations are repeated.

*24 sites could also be obtained by having 6 contractors with 4 per site

PROGRAM EVALUATION DESIGN:

<u>Contractor</u>	<u>Projects con- trasted at each site</u>
R&D #1	[LGT vs LGNT LGT vs EDT LGT vs EDNT LGNT vs EDT LGNT vs EDNT EDT vs EDNT
R&D #2	[LGT vs LGNT LGT vs EDT LGT vs EDNT LGNT vs EDT LGNT vs EDNT EDT vs EDNT
School District #1	[LGT vs LGNT LGT vs EDT LGT vs EDNT LGNT vs EDT LGNT vs EDNT EDT vs EDNT
School District #2	[LGT vs LGNT LGT vs EDT LGT vs EDNT LGNT vs EDT LGNT vs EDNT EDT vs EDNT

TASKS FOR PROPOSED EMPIRICAL POLICY STUDY:

planning

- Jan. NIE invites statements of interest and capability from two kinds of contractors:
- A. Research and Development Labs, Centers or private organizations. R&D organizations must include in their statement of interest a letter indicating that three school districts within a radius of about 200 miles of the organization will cooperate in locating approximately 12 Title I eligible schools.
 - B. School district research and evaluation units.
- The RFP process might be used for this task
- March NIE makes initial grants to four contractors (two R&D organizations and two school districts).
- April EACH contractor:
- A. Works in or with the school districts to identify populations of Title-I-eligible-but-non-target schools.
 - B. Approaches principals of these schools explaining the availability of funds for implementing programs according to one of four possible sets of regulations. It is explained that if the school participates it will receive funds to be expended for LTC projects, tutoring projects of their own design, replications of existing district projects or projects generated by their own staff and parents. Principals meet with teachers and parents to discuss acceptability of the conditions for participation in the study.
 - C. Obtains written agreements to participate from at least six sites.* The agreement states that schools will abide by the simulated Title I regulations to which they are assigned.

*a site is a school or pair of schools according to whether projects are within-school or cross-school projects.

D. Randomly assigns a pair of schools to each of the six treatment combinations.

May Each contractor prepares to provide formative evaluation during the project's first year. The formative evaluation has three objectives for each project:

1. project improvement
2. laying the methodological groundwork for summative evaluation--by development and validation of instruments, identification of appropriate blocking factors, and constant interaction with the project and project staff to ensure that the variables selected for study are those that adequately reflect the project
3. laying the organizational-political groundwork for summative evaluation--by obtaining commitment for an evaluation design that will permit the strongest possible conclusions to be drawn at each site regarding the effectiveness of the projects implemented at that site. Random assignment to the competing Title I projects will probably be required.

July/
August Teacher pre-service planning (and training too if desired by teachers).

implementation

year 1

Sept. - Projects run, each receiving a fixed amount of formative evaluation for improvement. Groundwork for summative evaluation is conducted as needed.
June

Dec. Each contractor produces for each project the outline of a design for summative evaluation which is submitted to NIE. The design describes:

- A. methods to be used to document the allocated and the actual time (no. of hours) for which students receive tutoring, are tutoring, or are being trained to tutor.
- B. methods used to document time (no. of hours) for which students receive competing Title I services.
- C. project specific outcome measures of student achievement and satisfaction.
- D. standardized outcome measures of achievement (and possibly of satisfaction).

Jan. NIE monitors approve or disapprove or request changes in the designs prepared for summative evaluation.

July NIE monitors may require administration of one test and one questionnaire across all projects to be given at the end of the second year.

year 2

Sept. Summative evaluation selection and assignment procedures are conducted under control of the summative evaluator.

Oct. Report to NIE on fidelity of implementation of the summative evaluation design that was submitted.

Sept. - Projects run for a second year with summative evaluations conducted for individual cycles or units of instruction or on a June half-year basis--according to the plans that were drawn up and approved by NIE.

Nov. Each contractor submits to NIE a full description of project characteristics at each site. The description includes a Project Implementation Review instrument which could provide a site-visitor with a way of checking and rating the extent to which a project has been faithfully implemented.

NIE draws up preliminary plans for independent site visitors (e.g., university personnel involved in teacher training near each site) and NIE monitors to conduct site visits.

Dec. NIE briefs site visitors on the putative characteristics of the projects at the 24 sites.

Dec. - Site visitors visit assigned sites and rate the fidelity of
Jan. project implementation.

Fed. Site visitors submit to NIE:

- A. their ratings of each project's implementation fidelity.
- B. a prediction as to which of the two treatments at each site visited will prove superior.
- C. a rating of the quality of learning that appears to be taking place in each treatment-mode at each site visited.

[Note: site visits are to be made at times when the contractors are not "on site." No contacts are permitted between contractors and site visitors. Violations result in contractors losing their funds while schools continue to receive their Title-I equivalents for the duration of the study.]

April Summative evaluation plans for the third year submitted to NIE

May NIE approves, disapproves or requests changes in the summative evaluation designs for the following year. NIE assigns each contractor to conduct a summative evaluation of two of the sites of another contractor. This simply provides external evaluation conducted by an evaluator familiar with the nature of the project.

year 3

Sept. - Repeat year 2 and add:
July

Sept. Each contractor collects retention test data on achievement of students who were in the projects the previous year.

July Summative evaluation reports are submitted by each contractor for each site.

Aug. - NIE reviews summative evaluations.
Oct.

NIE selects one contractor to synthesize results from all 24 sites, conduct extensive data analyses of these aggregated results and report findings in professional papers and for school audiences.

The virtues of this empirical policy study

To be realistic, the experiments must occur in real schools, but to be manageable they must, at least to start with, be of modest scope; they must be systematic in applying the same treatment in several different environments. The experiments should deal with important policy issues affecting acknowledged problems in our society (the financing and delivery of education to poor children fits this prescription beautifully.) [Timpane, 1970, p. 565]

(1) Fail-safe. The study is ambitious and if fully and successfully implemented would provide a very rich data base. Inevitably, given the nature of practical events, its implementation will be peppered with problems. However, the intact experimental design to be implemented at each of the 24 sites, under close supervision of the contractor and following approval by NIE, means that failure at one site does not preclude strong conclusions being drawn from other sites. Twenty-four independent tests will be conducted, each in a design with strong internal validity. Certainly not all will encounter insuperable problems.

(2) Rich data. By setting the size of the system to be evaluated at the level of a single site, it becomes possible for the full complexity of the project to be known to the evaluator. Qualitative knowing as well as quantitative will be possible. "Acquaintance with events and persons, extended across time and settings provides even the quantitative scientist with qualitative knowledge that enables him to catch misunderstanding, error, and fraud in his data. Where the same person runs the treatment program, collects the data, and analyzes the results, the qualitative support for the quantitative results is apt to be strong. Much or all of this acquaintanceship base can be lost in large-scale modern quantitative program evaluation." (Campbell, 1975)

(3) Freedom to fail. When funds are spent at one site on one kind of treatment (project) there is enormous pressure on evaluators to report the treatment as successful in the implied comparison with no-treatment. In this study, when two competing treatments are implemented at each

site, both treatments can be considered successful and it is not too threatening to report one treatment as even more successful than another. This will be especially so at sites in which the same teachers work in both treatments. Furthermore, reporting that tutees do not learn is acceptable because tutors can be blamed rather than teachers.

(4) Relevance. The policy study is policy relevant: it examines effects of feasible regulations tied to feasible levels of incentives and is conducted in an appropriate population. It might be argued that the use of volunteer schools and Title-I-eligible-but-non-target schools invalidates the study as being relevant to compensatory education policy. While conceding that results should be generalized only to schools that volunteer to accept an incentive, this is still a test of innovative compensatory education stimulated by incentives--a possible policy. Furthermore, it must be emphasized that volunteerism is not confounded with treatment. Treatments are randomly assigned following the volunteering. Nor are the students, on whom the outcome measures are made, volunteers. The study answers the question: given a school that volunteers to implement a compensatory education project, which of four kinds of projects (regulations) produces the best results?

With regard to the population, we suspect that results could be generalized to the target-Title I-population. However, even if this suspicion is incorrect, the non-target population is still policy-relevant. If this study can show an effective means of promoting achievement among students in need of, but not currently served by, compensatory education funds then this is persuasive evidence in favor of extending the scope of compensatory education funding to include such students. To increase funds in a way demonstrated to be effective is far more acceptable than increasing funding on the basis of hope.

(5) Cost. Funds for this empirical policy study are not all to be seen as research funds. Approximately half the budget provides direct services to children in need of compensatory education.

"In greatest need of assistance"

--What does it mean?

It might not be expected that the kind of testing procedures employed in a program would have any profound effects on the program's impact or on its underlying rationale or procedures, but the arguments below suggest that such might be the case in the Title I program. It is argued here that current reliance on norm-referenced tests is hindering the achievement of demonstrable success in the Title I program. A shift from norm-referenced to criterion-referenced testing in Title I projects would:

- provide the Title I program with a defensible rationale
- permit the setting of realistic objectives
- provide clearly interpretable outcome measures thus making it possible to demonstrate success

The Difference Between Norm-Referenced Tests (NRTs) and Criterion-Referenced Tests (CRTs)

As the terms imply, it is primarily the way in which a score is "referenced" that distinguishes between the two kinds of tests. In norm-referenced testing, a pupil's score is referred to the distribution of scores in a "norm" group, a representative sample of students to whom the test publishers gave the test. The test result tells where the student placed in the norm group, that is, how well the student did with respect to the representative sample of students. For example, a pupil's score may be reported as 20th percentile meaning that he/she placed above about 20 percent of the norm group. (Since 20 percent represents one fifth, the pupil scored at the top of the lowest fifth.) Notice that a percentile score only tells where the student placed with respect to other students in that particular norm group on that particular test. It does not indicate specifically what the student showed he/she could or could not do on the test.

In criterion-referenced testing, a pupil's test performance is reported in terms of performance criteria, usually mastery or non-mastery of specific skills or instructional objectives. Thus criterion-referenced testing for a kindergarten child might report whether or not the child can name six colors correctly, write his/her own name, or tie a shoelace. At a higher level, a pupil's scores might report whether or not the pupil can add a column of six two-figure numbers, complete an application form without errors, or use a particular spelling rule.

Clearly if a group of students took both kinds of tests, the results would be correlated. For example, students who had a low percentile rank in reading would tend to be less likely to be able to complete an application form than students with a higher percentile rank in reading achievement. It is sometimes possible, indeed, to use the self-same test as either norm-referenced or criterion-referenced, by reporting results either in terms of a pupil's ranking or in terms of the skills which the student has or has not mastered, based on an analysis of the test items passed or failed by the student. However, the manner in which a test is to be used--as a NRT or as a CRT--strongly affects the methods used to construct it and consequently most NRTs are not suitable for use as CRTs. Hence the need for an early decision, in planning a program, as to which kind of test to employ.

How do the differences between NRTs and CRTs influence

- (a) Title I's rationale or ethical basis?
- (b) the setting of objectives?
- (c) interpretation of outcomes?

(a) Rationale and ethical basis for Title I. Underlying any public policy are ethical or value related assumptions, and these frequently need examination in any consideration of that policy. In passing ESEA Title I, Congress was clearly concerned with the detrimental effects of poverty on school attainment. "Compensatory education" was to compensate for educational deprivation among children

in poverty area schools. But why are low achieving pupils in poverty area schools provided with special services--compensatory education--when average or high achieving pupils in those same poverty areas are not?

There is no evidence that the effects of living in a poverty area are more detrimental for low achieving students than for high achieving students. If the Title I program is meant to compensate for the effects of poverty on educational attainment, then it should serve equally children of all ability levels. Special funds should be available to help those students who need extra instruction in order to reach college as well as to help students who need extra instruction to graduate from high school.

Indeed, in the early years of the Title I program, some districts felt that those "in greatest need of assistance" were the pupils falling furthest below their potential, regardless of absolute level of current achievement, and they allocated Title I funds accordingly. OE interpretations, however, have consistently required that targetting of students be based on current achievement level--those most in need are defined simply as those furthest behind on norm-referenced tests. Given this concentration of resources on low achievers, if the Title I program were successful beyond belief, it would still alter only the distribution of achievement at the lower end of the scale. But pithily, and extrapolating to job categories, we'd have more Black clerks but not more Black managers.

What justification can there be for the devotion of greater resources to low achieving poor children than to high achieving poor children? Jencks et al. argue that if maximum total satisfaction were the criterion for justification, quite the opposite distribution of resources would be made:

People who know a lot generally value additional knowledge and skills more than those who know very little. This means that insofar as knowledge or skill is valued for its own sake, an unequal distribution is likely to give more satisfaction to more people than an equal distribution (Jencks et al., 1973, p. 11).

However, the allocation of greater resources to low achievers can be justified if there are some minimal skills--Michael Scriven has called them survival skills--that an individual requires in order to function in a modern urban

society. If some minimal levels of competence are required for earning a living and coping with urban life, then it is justifiable to ensure that pupils leaving school have these competencies, even if this requires spending extra funds on those who take longer to achieve them. The justification lies in the problems arising for the individual and for society when persons do not have minimal competencies for self sufficiency, particularly in a society in which unskilled jobs are becoming scarcer.

This minimal basis competencies or survival skill position provides a defensible rationale for focussing compensatory education on the low achieving students. Its acceptance, it will be argued below, would make success of the program both more likely and more demonstrable. (It should be pointed out that its acceptance might have other consequences. The minimal competencies position does not need to be tied to the poverty criterion at all. Another possible consequence of the competencies approach is greater attention to secondary as opposed to elementary pupils, since in the secondary years it will be clearer which students are failing to demonstrate the basic competencies they should attain before leaving school.)

The decision will have to be made at a Congressional level: Is the Title I program designed to compensate for the effects of poverty (in which case it should serve the poorest children regardless of ability or achievement level), or is the Title I program designed to provide supplementary educational services to children falling below acceptable levels in basic skills? If the latter, then the tests used to target pupils and to measure project success should be criterion-referenced tests designed to measure acceptable levels in basic skills.

(b) The setting of objectives. Large numbers of Title I projects have taken as their goal the achievement of better than a month's gain on a norm-referenced test for a month's instruction. The gain is measured by changes in grade equivalent scores on norm-referenced tests. Such gain scores, however, are invalid indicators. As an Office of Education report pointed out (quoted in full on p. 59 in CSE Report on Tutoring #1):

- project students can show better than month for month gains yet never catch up with their more advantaged peers.
- project students are virtually precluded from showing month for month gains or better since the typical or average student (who is not disadvantaged) only gains two thirds of a month per month.
- a program that administers its pretest late in the Fall and then posttests early in the Spring will show more month per month growth than a program that tests early in the Fall and late in the Spring, even though the latter program might be considerably more effective than the former.

Such artifacts, consequent upon the use of grade-equivalent scores from norm-referenced tests, make the setting of goals and objectives a procedure of rough guesses in a situation which for everyone, but especially for parents and teachers, is obscure and unpredictable. To set goals based on norm-referenced tests--such as month for month gains--is to run the risk of obtaining only chance results influenced more by test artifact than by actual effectiveness of the project. Furthermore, it represents taking on faith the supposition that school resources can substantially affect scores on norm-referenced tests.

There are many researchers who doubt that norm-referenced, timed, standardized tests are sensitive to the effects of schooling. Quite certainly, the preponderant evidence suggests that, short of teaching to the tests (which would be a violation of professional ethics and would in any case invalidate any meaning the tests have) schools can rarely make any significant or sustained differences on norm-referenced achievement tests (Coleman, 1966; Jencks, 1972). To doubt that resources or, indeed, schools themselves, can influence norm-referenced test scores is not to take the position that schools are ineffective. Actual achievement could be affected by school procedures but yet not be detected by norm-referenced tests because of their method of construction.

By contrast, when specific objectives in minimal competencies guide daily instruction, students usually do attain such measurable, limited sets of objectives. Specific objectives in minimal competencies should be the objectives of Title I projects. If minimal competencies were identified, parents and teachers could rank order the competencies by importance, prepare individual plans for the achievement by each pupil of the competencies he/she lacked, and

thus obtain clear, well-defined, understood, feasible and measurable objectives both for individuals (as urged in Title I regulations §116.47) and for the projects as a whole.

(c) Demonstrable success. Present evidence suggests that schools can have little effect on standardized norm-referenced test results but can teach specific objectives (Coleman, 1966; Jencks, 1972; Walker and Schaffarzick, 1974). Consequently, to report Title I results in terms of the number of pupils mastering various basic competencies is to make success more demonstrable. Such a measure is more readily understood and more widely credible than any manipulation of norm-referenced statistics.

There are, of course, problems associated with criterion-referenced testing. For example, any attempt to designate what constitutes "mastery" and what competencies represent essential survival skills will usually encounter lengthy debate. However, norm-referenced testing does not solve those problems but only ignores them. It is precisely because the judgments made in criterion-referenced testing are concrete and open to inspection, because the process of criterion-referenced testing is so readily comprehensible, that the procedures become open to questioning from many sides. In norm-referenced testing, the items rarely come under public scrutiny, but the judgments as to what represents appropriate content are made nevertheless.

It is arguable that the more open process is desirable even if it provokes debate--perhaps, indeed, this controversial aspect would turn out to be one of the virtues of CRTs. Clearly the relative merits of the two systems need greater study. Therefore:

It is recommended that a randomly selected part of the Title I program, say a dozen school districts, be planned and evaluated in a "minimal competencies framework," employing criterion-referenced testing, for a period of three years following which time this experimental part of the program be evaluated in conjunction with an equivalent control group in the Title I program which has continued to operate the Title I program on the basis of reliance on norm-referenced tests.

The minimal competencies framework consists of:

Rationale. Funds are used to ensure specified minimal competencies.

Needs assessment and program planning. Needs are assessed in terms of which minimal competencies pupils have or do not have. This assessment translates directly into individual plans for each pupil to be given instruction in the competencies he/she lacks.

Evaluation. The major outcome measure is the readily interpretable information as to the number of students achieving mastery of various minimal competencies, an outcome measure far more likely to show success than the kind of goals set for norm-referenced achievement tests.

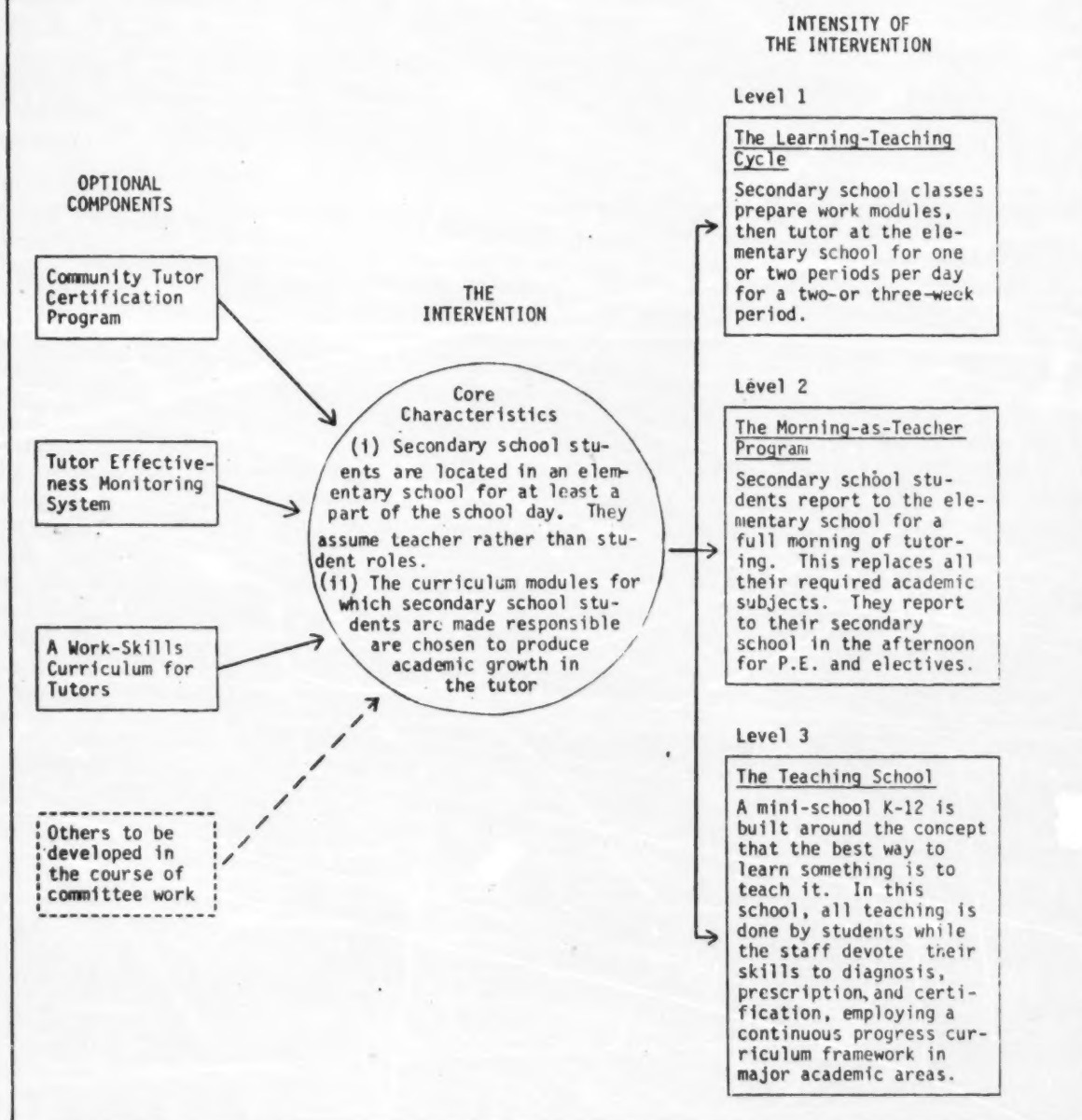
HISTORICAL NOTE

On the following page is an extract from the original proposal. In the course of the study, it became apparent that the Learning-Tutoring Cycle was the most widely acceptable project, and since wide acceptance will be necessary for widespread impact, the Learning-Tutoring Cycle has become the focus of our recommendations. Report #4 presents the ideas for the more ambitious projects.

Extract from original proposal:

The Role Change Intervention has been designed to manipulate a powerful variable - the social-psychological context of schooling - in a highly evaluable way.

The design is defined by two "core characteristics" which lend themselves to operational definition and, therefore, measurement. To these core characteristics, certain "optional components" can be added. The intervention can be implemented one classroom and one school period at a time or can be applied at high intensity to a whole school.



Reading About Tutoring

The following CSE Reports on Tutoring are available from the Center for the Study of Evaluation, UCLA Graduate School of Education, 145 Moore Hall, Los Angeles, California 90024.

A. The Learning-Tutoring Cycle: An Overview *

An overview of the entire project and recommendations for actions which are designed to put the ideas of this study to the test--to see if the Learning-Tutoring Cycle can indeed significantly improve the educational attainment of disadvantaged students.

#1. Setting up and Evaluating Tutoring Projects

A listing and explanation of decisions that must be made at each school site when a tutoring project is started. Pros and cons for each decision are presented for discussion. A step-by-step outline of evaluation activities is included.

#2. Tutoring and ESEA Title I

A guide to setting up a tutoring project that conforms to Title I requirements and benefits both secondary and elementary school students. Of particular interest to Title I planners, parents, teachers and district personnel.

#3. A Survey of Tutoring Projects

A nationwide survey of tutoring projects and a description of site visits to some existing tutoring projects.

#4. Tutoring: Some New Ideas

Description of a specific approach to tutoring in which the focus is on the learning and motivation of the tutors. Included also are ideas on expansion of tutoring to provide significant educational alternatives, as in a School-Within-A-School project. The reactions of teachers to the ideas are documented.

#5. An Analysis of the Literature on Cross-Age Tutoring

A literature review that examines both laboratory studies and in-school programs to identify important issues in tutoring.

#6. Tutoring and Social Psychology: A Theoretical Analysis

An examination of tutoring from the perspective of social psychology. Presents operationalized hypotheses that researchers might test.

*This report you are presently reading

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